Dec 59 Dec 59

Review of Photographic Intelligence Research and Development Activity

Accomplishments 1959

1. Systems development in automation for the Photographic Intelligence Center have matured greatly in the 1959 period. Automatic coordinate measuring devices in both the 30M and 1-2M accuracy ranges have been completed and are available for rapid, accurate, readout and automatic plotting in our center, the first produced anywhere in the United States. Coordinate measurements are read directly on the Richardson VF500 or (20M), the Mann Comparator (2M) or the Nistri TA3 ($\frac{xy}{2M}$ - z) from the raw photography. This produces punched tapes of unrectified data which are fed into the electronic computer. Extensive electronic computer programing accomplished in 1959 on a contract basis allows this raw punched tape to be converted to the rectified and scaled positions desired. This data can be presented in tabular form for use in reports or held in punched tape form which can serve as input to automatic electronic plotting equipment for graphic display. This saves literally thousands of manhours of time previously spent doing these same operations manually.

2. An electronic rectification device has been translated into a workable breadboard item which is universal in its application. It can be programmed to rectify photographs of any focal length or geometric configuration at varying magnifications exploiting as high as 80 lives per millimeter resolution. This is a technological break through which will have great impact in future programs because any known distortion can be compensated for even curvilinear geometry which was hitherto impossible. The joint procurement program is buying four production models at $250,000.00 the vanguard of more sophisticated designs which are now on the drawing board.

SUBJECT: Review of Photographic Intelligence Research and Development Activity

3. Resolution exploitation achievements are manifested in the design and delivery during 1959 of the Wild M.S. Stereo microscopes which are now the standard PI instrument at PIC/CIA giving us a capability of fully exploiting 200 lines per millimeter resolution with the par focal 6, 12, 25, & 50X choices of magnification as well as a 10M comparator base and goniometer capable of reading to 30' of arc.

4. Important strides have been made in viewing equipment, rear projection stereo, Richardson projectors, Richards light tables with milar belts to prevent film scratching, improved micro enlargers 10X and 20X, one stage, etc. Zoom stereo microscopes by Bausch and Lomb have been developed and are on order in quantity at very low unit cost for standard PI viewing.

5. Extensive research in image enhancement, phase and dark field michrography have resulted in advanced techniques of image exploitation and edge gradient determination. New image enhancement equipment such as the Areal Filter apparatus developed by Itek have been developed.

6. Research resulting in the manufactor of new continuous 4X enlarger for 70 millimeter panoramic photography has been successfully achieved for the first time in the Photo Devices 4X enlarger. This gives a capability of producing high quality 4X enlargements continuously at a rate of up to 80 per minute.

7. The PI cell arrangement for automating the photo intelligence process has advanced to the system's design study stage. Each of the components have been tested separately and have been successful.

SUBJECT: Review of Photographic Intelligence Research and Development Activity

8. Automation of target brief listings and mission coverage summaries as well as immediate reporting are standard practices adopted during 1959 using the latest up to date IBM equipment and procedures.

10. Advanced design, special viewers and printing techniques are being presently manufactured to speed up handling and exploiting special configmation photography which is an input to the center. This system is designed to speed up the highly sophisticated complex large format photography we receive in large quantities.

11. An automatic processor for rolls of aerial negatives has been designed to specifications formulated by center personnel which should answer our production requirements in this field. All of the available service produced items had serious shortcommings which made new developments necessary. This is now being jointly procured on a limited production for the intelligence community.

General

The trend of developments in the space age are generally in two directions:

First a concerted national effort is now being implimented to obtain total photographic coverage of all areas of the world of strategic interest which encompasses at least ½ of all the land area of the globe. The requirements of quality for this coverage challenge the upmost of U. S. technology to produce not only the volume but the resolution in order to yield the information required. However, these are achievable within the limits of present engineering available.

Secondly the Intercontinental ballistic missle programs require that all potential targets be located with unprecidented precision. This means that the entire globe must be geodetically measured to one datum. Photography is again the only sensor medium to record and measure the termendous scope of this work with the timeliness to achieve the desired results. This photography will be of only limited usefulness to intelligence per se but all other photographic holdings can readily be correlated with the basic coverage.